

MILLIMAGNITUDE VARIABILITY OF GALAXIES IN THE KEPLER FIELD

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We propose to monitor about 400 small galaxies in Kepler's field of view for photometric variations at the millimagnitude (mmag) level to detect active galactic nuclei (AGN) at unprecedented low amplitude of variability or brightness. Since ~8% of galaxies are known AGNs (Sarajedini, 2008), we expect to find of order 32 normal AGN in our sample, but an unknown number of low amplitude AGN. The excellent photometric accuracy of Kepler makes it an ideal instrument to investigate the unexplored regime of very-low amplitude variability in AGN, on timescales from a year down to a week, or less. The technical goal of our proposal is to improve the long-term absolute photometry by a factor of several (10x is the photon-noise limit) so that we can push the limiting Eddington ratio even further into the unexplored region of AGN variability for low luminosity objects. Our current-best photometric stability is already better than 3 mmag for data extracted within a given quarter in the Kepler full-frame images.